NMED/SWQ-94/4

WATER QUALITY AND WATER POLLUTION CONTROL IN NEW MEXICO

1994

A Report Prepared for Submission to the Congress of the United States by the State of New Mexico Pursuant to Section 305(b) of the Federal Water Pollution Control Act

New Mexico Water Quality Control Commission

P.O. Box 26110
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September 1994

This year the USFS completed the reconstruction of Forest Road 480 in the Bluewater watershed. The road has been removed from drainages. At stream crossings, a system of culverts that allow sediment capture, increased loading to the watertable, and a corresponding development of riparian vegetation was installed.

This year the USFS also completed the final EA on the reconstruction of the main road through the Zuni Mountains. One of the primary goals of the project is to restore over one-thousand acres of wetland and riparian habitat by applying innovative road construction techniques such as french drains, raised culverts, velocity checks/plunge pools, and redesigned placement of ditches and culverts. The objective is to restore natural patterns of surface and subsurface flows.

Continuing Watershed Projects Update

Comanche Creek/Costilla Creek Watershed Project

The Comanche Creek/Costilla Creek Watershed Project was originally initiated during the early phase of nonpoint source work in New Mexico. As part of the NPS effort funded under the FY91 CWA § 319 grant, NMED has expanded upon the earlier efforts within this targeted watershed.

Due to recognizable problems from heat gain, turbidity and sediment delivery, NMED coordinated the placement of riparian exclosures, and initiated extensive revegetation efforts in order to provide water quality benefits. Many of the efforts initially planned as part of the Comanche Creek Watershed have been expanded in this project.

French Mesa Watershed

The French Mesa Watershed Project was a co-recipient of the EPA Region VI Regional Administrator's Nonpoint Source Pollution Environmental Excellence Award Program in the Watershed Protection Category. The USFS, recognizing that grazing practices on public lands within the watershed had resulted in the degradation of water quality, took steps to establish a cooperative effort with grazing-permit holders. A combination of structural and nonstructural BMPs were begun within the project area in an effort to provide improvements in water quality. Construction of earthen dams designed to provide alternative water sources for cattle, reduce sedimentation and provide for a rise in the watertable was followed by the implementation of rotational grazing practices. The resulting improvement in cattle production and water quality provides benefits to both producers and the environment. Efforts to reduce the impacts from overgrazing are continuing in the watershed.

Red River Ground Water Project

The Red River Ground Water Project was developed to determine the quality of ground water infiltration into the Red River. The project was funded under the FY92 CWA § 319 grant, and included devising the implementation of BMPs in order to provide for water quality improvement. The Red River is a gaining stream known to have been impaired during the last quarter-century. Sources of ground water impairment will be determined if possible, as well as ground water flow direction, rate of infiltration, and types of pollutants. Appropriate BMPs to address the impacts to ground water will then be selected and recommended to regulatory and management agencies for implementation.

NMED staff are coordinating activities related to the Molycorp Mine. Monitoring wells at the Molycorp tailings area have been sampled. Data acquired will allow for efficient planning of necessary BMPs. Seeps and springs along the Red River have been investigated in addition to several wells in USFS campgrounds and at summer homes in the Bitter Creek area. Maps, reports and aerial photographs relevant to the Red River watershed project have been acquired and studied. Geological reports and other pertinent literature have also been reviewed. The Carson National Forest was contacted for information on wells and a well inventory has been initiated. The BLM's Taos Resource Area Office was also contacted for information.

Red River Watershed

The Red River Watershed covers an area of approximately two-hundred twenty-six square miles, is a major tributary to the Rio Grande and begins as headwaters originating from the highest country in New Mexico. The east or main fork of Red River begins at nearly thirteen-thousand feet as springs just east of Wheeler Peak. The Red River has twenty-one perennial tributaries which originate as very high quality mountain streams. There have been numerous intensive studies done in this river system. This is due to the many historical and current water quality concerns located throughout the watershed.

Those tributaries that do not incur major concentrations of mining operations remain high quality streams at normal or base-flows up to their confluence with Red River. Most of the mining in this watershed is concentrated in seven tributaries and in the middle reach of the mainstem of Red River. Metal loading in normal or base-flow conditions is not a serious problem until the mainstem of Red River encounters the five-square miles (thirty-two hundred acres) of mining-related disturbance at the Molycorp mine operation some twelve miles above the confluence of the Red River and the Rio Grande. At least eight miles of Red River, from Molycorp to Lama Canyon, is essentially a biologically dead reach. This reach of Red River is damaged in greatest measure due to continual metal loading from "steady-state" seeps issuing from a number of locations along a six-mile section of the middle reach beginning below the Molycorp Mill and persisting until about the border of the Questa Ranger District of the Carson National Forest (Figure 30).

Pulse loading of metals and other sediments is a significant problem in Red River and several of its tributaries. SWQB's Standards and Surveillance Section has documented a rapid decrease in pH and increase in turbidity in the mainstem of Red River just below a tributary above Fawn Lakes Campground in response to a summer rain event. Analysis of water samples collected during this pulse event showed that metal loading also increased dramatically. Only two of the twenty-one perennial tributaries to Red River, Columbine Creek and the Upper East Fork, do not contribute significant amounts of sediment in response to pulse events. Both of these sub-watersheds are roadless.

The Red River Watershed is one of the most severely impacted perennial stream systems in regard to metal loading in New Mexico. The mainstem of Red River is also among the most intensively studied stream reaches in New Mexico. In April of 1992, NMED began comprehensive documentation of the sources of metal loading in the upper watershed of Red River. Many of the smaller-problem minesites in this watershed are located on public lands within the Carson National Forest. The process of implementing appropriate BMPs to reduce, control, or eliminate sources of metal loading on the Carson National Forest is well underway. However, the largest sources of metal loading within this watershed are located on private patented inholdings removed from the public trust under provisions of the General Mining Law of 1872. Any measurable level of success in restoring health and productivity to the middle reach of Red River will require significant levels of long-term funding dedicated to this issue.

Figure 30. A Typical Acidic Metal-Loaded Seep Reaching the Red River Near the Molicorp Mine Site.

Upstream from Molycorp the contribution of steady-state, acidic metal-loaded drainage is handled without apparent serious impact by the natural buffering capacity of Red River. For several miles at and below Molycorp, the sheer volume of steady-state metal-loaded drainage seeping out of mine waste dumps and the old underground workings overwhelms the river and has rendered it dead for at least eight miles.

There are three known leaking underground storage tank sites in the town of Red River. At all three sites, the tanks have been removed and soil/ground water contamination documented. Only one site has had a remediation system installed, but even at that location apparent releases of hydrocarbons occur seasonally which enter Red River via storm drains. The detrimental effects to the river from the spills is of a temporal nature, however, while the impacts from the mine sites is perennial.

Most water quality data available for this watershed was collected during normal or base-flow conditions. As efforts to provide improvements within the watershed increase, emphasis must be placed on discrete runoff events in order to more accurately characterize the effects of the resource extraction activities on water quality. A long-term program of systematic BMP implementation to reduce, control, or eliminate pulse loading from dozens of small minesites and erosional scars caused by mining exploration and development awaits adequate funding and agency resources.

Upper Pecos River Watershed

The main stem of the Pecos River and its tributaries north of U.S. Interstate-25 are valued as some of the most outstanding and scenic high-mountain recreational areas in New Mexico. For many years it has been recognized that the Terrero mine and its waste pile located less than twenty miles from the source waters of the Pecos, and the associated mill site in Alamitos Canyon twelve miles to the south constitute serious sources of contamination to the Pecos River. During the past five years NMED has generated a significant body of data on the sources, pathways, and extent of contamination originating from these sites. As a result of this information, NMED began a comprehensive study of the entire Upper Pecos River Watershed to identify other possible sources of metal loading and to encourage and direct the implementation of appropriate BMPs to control this form of pollution.

Figure 31. Typical Seep Discharging White Metal-Loaded Flow into Willow Creek at Terrero Mine Site.

Overall water quality in the Upper Pecos is generally very good at normal or base-flow conditions. Sediment loading in response to pulse events is a problem from a number of source categories. Metal loading from mineral extraction and processing sites in the Upper Pecos has thus far been adequately handled by the natural buffering capacity of the river, except for several notable exceptions during pulse events. During those events, loading is significant from two sources; the Terrero mine/waste pile on the Pecos at the confluence of Willow Creek and the mill site in Alamitos Canyon where Terrero ore was once processed. The mill is two miles northwest of the village of Pecos. NPS problems at the Terrero minesite are primarily related to the cross-slope placement of approximately a hundred-fifty thousand cubic yards of sulfide-containing mine waste rock. This common waste disposal configuration truncates natural drainage and intercepts runoff from upslope areas placing water in contact with sulfide materials, and sufficient oxygen to produce a steady-state flow of acidic mine drainage with attendant metal loading (Figure 31). Pulse events also transport tons of metal-rich sediment from the Terrero Mine to the Pecos River. Zinc, aluminum, and other metals transported from Terrero during pulse events have caused fish kills at the Lisboa Springs Fish Hatchery eleven miles downstream for a number of years. A number of other small minesites are scattered around the Upper Pecos, but for the most part these sites have not been found to be significant sources of metal loading.

The Terrero Mine and the associated Alamitos Canyon Mill site are at present the only significant sources of metal loading to the Upper Pecos. A site assessment and cleanup plan for these areas is well underway. These efforts are being funded through State and private sources rather than federal funding.

BMP application in the Upper Pecos Watershed has been influenced greatly by NMED because of the recognition of and response to metal loading from the Terrero Mine and related issues in the Upper Pecos Watershed. The issue of lead-laden sulfide mine wastes on area roads has been addressed by at least temporary containment measures on public lands within the watershed.

The use of mine waste on roads and recreational areas has been a related issue which has been addressed through cleanup efforts. Runoff from these areas was recognized as a water quality issue which needed to be addressed. As a result, through a coordinated effort the State owned and operated recreation areas affected by the use of waste rock have been cleaned up and reopened. In addition, USFS has initiated mitigation efforts on Forest Service roads and recreation areas.

Although the process of implementation is slow, plans to reduce, control, or eliminate the major sources of metal loading to the Upper Pecos are basically in place. The conditions placed on future mineral development in the Upper Pecos should grow out of our direct and detailed knowledge of the potential negative impacts.

Gila-San Francisco River Watershed

The Gila-San Francisco River Watershed covers an area in New Mexico of over six-thousand square miles. The San Francisco River, the major tributary of the Gila system in New Mexico, originates in eastern Arizona from the Mogollon rim south of Alpine and from the Colorado Plateau and isolated volcanic mountain ranges to the north. There are no major hard-rock mining districts within the extreme headwaters of the San Francisco River in Arizona. The San Francisco River enters New Mexico and flows in a ninety-mile arc through the Apache and Gila National Forests before re-entering Arizona. Within this reach of the San Francisco River there is one principle source of metal loading from the Mogollon Mineral District. Mineral Creek, and its principle tributary, Silver Creek are the hydrologic conduits that transport metals from the mines and mills around the town of Mogollon to the San Francisco River.

Table 19. Assessed Stream Reaches with Threatened Designated or Attainable Uses.

Water Body (Basin, segment) Evaluated or Monitored (E/M)	Uses Threatened[a] (see Table 21a)	Probable Causes of Threat	Toxics at Acute Levels[b]	Toxics at Chronic Levels[b]	Probable Sources of Threat (see Table 21b)	Total Size Affected (Miles)
Costilla Creek from irrigation diversion above Costilla to Comanche Creek (Rio Grande, 2-120), M	HQCWF	Flow alteration, turbidity, reduction of riparian vegetation, streambank destabilization			Hydromodification (7400), Agriculture (1500), Road Maintenance (8300)	13.0
Comanche Creek from Little Costilla Creek to headwaters (Rio Grande, 2-120), M	HQCWF	Temperature, siltation, total phosphorus, reduction of riparian vegetation, streambank destabilization			Agriculture (1500), Silviculture (2300)	7.2
Red River from Placer Creek to confluence of East and West Forks of Red River (Rio Grande, 2-120), M	HQCWF	Siltation, habitat alteration			Construction (3200), Resource extraction (5100)	5.5
Columbine Creek at its mouth on Red River (Rio Grande, 2-120), M	HQCWF	Siltation, habitat alteration			Recreation (8700)	0.5
Mallette Creek from mouth on Red River to headwaters (Rio Grande, 2-120), M	HQCWF	Turbidity, total phosphorus, metals			Recreation (8700, 8701)	2.3

a = Conclusions concerning attainment of fishery uses are largely based on water quality analysis, where available, biological data was used to verify these results.

b = All toxics for which EPA has prepared a CWA § 304(a) guidance document were reviewed as required by EPA.

Table 19. Assessed Stream Reaches with Threatened Designated or Attainable Uses, continued.

Water Body (Basin, segment) Evaluated or Monitored (E/M)	Uses Threatened[a] (see Table 21a)	Probable Causes of Threat	Toxics at Acute Levels[b]	Toxics at Chronic Levels[b]	Probable Sources of Threat (see Table 21b)	Total Size Affected (Miles)
West Fork Red River from confluence with East Fork to headwaters (Rio Grande, 2-120), E	HQCWF	Siltation, habitat alteration			Recreation (8701)	2.6
Middle Fork Red River from mouth on West Fork to headwaters (Rio Grande, 2-120), E	HQCWF	Siltation, reduction of riparian vegetation			Recreation (8700, 8701)	1.3
Rio Hondo from South Fork of Rio Hondo up to Lake Fork Creek (Rio Grande, 2-120), M	HQCWF	Siltation, nutrients, oil & grease, petroleum products			Recreation (8701, 8704, 8705), Highway runoff (8300), Domestic Point Sources (0201), Spills (8400), Construction (3201)	5.0
Rio Santa Barbara from village of Rodarte to confluence of East and West Forks (Rio Grande, 2-120), M	HQCWF	Siltation, total phosphorus, nutrients			Recreation (8700, 8701)	6.2
Rio Pueblo from confluence with Rio Santa Barbara to headwaters (Rio Grande, 2-120), M	HQCWF	Turbidity, nutrients, siltation, habitat alteration			Recreation (8700, 8701), Construction (3200), Agriculture (1500)	22.2
Tesuque Creek at its confluence with Little Tesuque Creek (Rio Grande, 2-118), E	HQCWF	Siltation, flow alteration, reduction of riparian vegetation, streambank destabilization			Hydromodification (7100), Road maintenance (8300)	1.0

Red River from mouth on Rio Grande to Placer Creek (Rio Grande, 2-119), M	CWF[c], L&WW IRR	Metals, turbidity, siltation	-	Cd, Zn, Al	Resource Extraction (5600, 5700, 5900), Agriculture (1500), Road Construction/ Maintenance (8300)	20.2
Bitter Creek from mouth on Red River to headwaters (Rio Grande, 2-120), M	HQCWF	Metals, siltation, reduction of riparian vegetation, streambank destabilization	-	Al	Resource Extraction (5100, 5800), Road Runoff (8300), Recreation (8700), Agriculture (1500)	7.1
Pioneer Creek from mouth on Red River to headwaters (Rio Grande, 2-120), M	HQCWF	Turbidity, siltation, reduction of riparian vegetation, streambank destabilization	-	-	Resource Extraction (5200, 5900), Recreation (8701, 8705)	4.3
Placer Creek from mouth on Red River to headwaters (Rio Grande, 2-120), E	HQCWF	Siltation, reduction of riparian vegetation, streambank destabilization	-	-	Resource Extraction (5300, 5900)	1.3
Cabresto Creek from mouth on Red River to headwaters (Rio Grande, 2-120), M	HQCWF	Flow alteration, reduction of riparian vegetation, siltation, turbidity	-	-	Agriculture (1200, 1500), Road Construction/ Maintenance (8300)	5.0
Rio Hondo from mouth on Rio Grande to South Fork of Rio Hondo (Rio Grande, 2-120), M	HQCWF	Temperature, pH, un-ionized ammonia, siltation, nutrients, reduction of riparian vegetation, streambank destabilization	-	-	Recreation (8700, 8701), Construction (3200), Agriculture (1201, 1500)	11.5
Rio Fernando de Taos from mouth on Rio Pueblo de Taos to headwaters (Rio Grande, 2-120), M	HQCWF	Metals, turbidity, total phosphorus, siltation, reduction of riparian vegetation, streambank destabilization	Al	-	Agriculture (1500), Recreation (8700, 8701)	15.6
Rio Pueblo de Taos from mouth on Rio Grande to Rio Grande del Rancho (Rio Grande, 2-119), M	CWF, IRR	Temperature, un-ionized ammonia, pathogens, chlorine	-	-	Agriculture (1500), Municipal Point Sources (0200)	7.5

a - Conclusions concerning attainment of fishery uses are largely based on water quality analysis, where available, biological data was used to verify these results.

b - All toxics for which EPA has prepared a federal Clean Water Act § 304(a) guidance document were reviewed as required by EPA.

c - Pollutants present in concentrations or combinations such that designated or attainable uses are not supported.